Partial lobar torsion secondary to traumatic hemothorax

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Supplemental material is available online.

Clinical Summary

A 58-year-old man with a known history of chronic obstructive pulmonary disease was involved in a motor vehicle collision in which he sustained blunt thoracic trauma. At the time of his initial presentation, a chest computed tomographic (CT) scan was obtained, which demonstrated multiple right-sided rib fractures and a moderate ipsilateral pulmonary contusion. Of note, the patient also had bullous emphysema. The patient was admitted for observation and analgesia. On the third day of his hospitalization, the patient started having worsening shortness of breath and had increasing supplemental oxygen requirements. A chest x-ray film obtained 5 days after admission suggested the presence of a new right basilar pleural effusion and a patchy right upper lung opacity consistent with lung contusion (Figure E1). A repeat chest CT scan was obtained, which confirmed a moderate-sized right hemothorax. When compared with the CT scan at admission (Figure 1, *A*), the twirling appearance of the lung parenchyma with displacement of two large bullae in the right lower lobe were suggestive of a partial lobar torsion (Figure 1, *B*). Strikingly, compared with the initial imaging (Figure E2, *A* and *B*), the CT scan also demonstrated flattening of the right atrium as well as retrograde flow of intravenous contrast into the azygos vein (Figure 2, *A* and *B*). These findings were believed to be related to right atrial compression by the torsed right lower lobe. The right lower lobe was otherwise aerated, indicating patency of lobar and segmental bronchi, and there was no radiographic evidence of vascular compromise.

On the basis of the clinical and radiologic findings, the patient underwent an emergency exploration of the right side of the chest through video-assisted thoracoscopy. Preoperative examination with a flexible bronchoscope revealed patent lobar and segmental bronchi bilaterally without any evidence of mucosal changes. Under selective ventilation of the left lung, the right chest cavity was inspected. The inferior aspect of the right lower lobe was found to face the lateral chest wall despite the integrity of the inferior pulmonary ligament. Approximately 600 mL of clotted blood was evacuated, which allowed the right lower lobe to return to its anatomic position. The right lower lobe did not appear ischemic. The patient recovered well and was discharged home on postoperative day 7.

Discussion

The close relationship that lungs and their semirigid bronchial tree have with mediastinal structures, as well as the presence of ligamentous connections to the diaphragm, makes pulmonary torsion a rather unusual event. In fact, a survey conducted in the United Kingdom indicated that 70% of practicing thoracic surgeons had never seen a case of pulmonary torsion.[1] The vast majority of pulmonary torsions have been observed after pulmonary resection, and torsion of the right middle lobe after resection of the right upper lobe is

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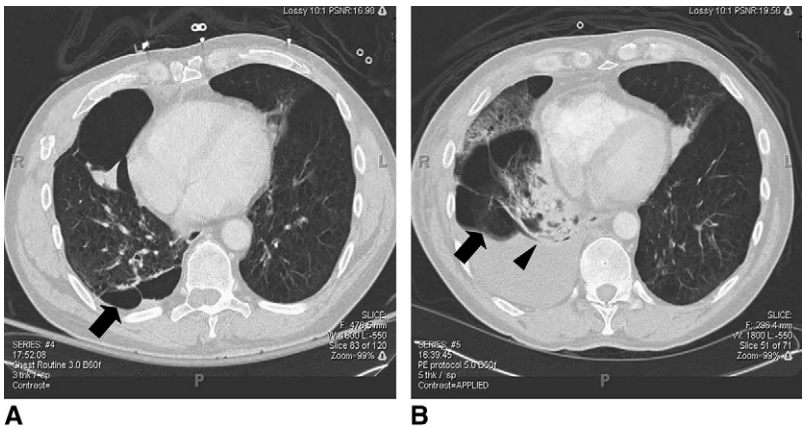

A B

Figure 1. A, Original finding of large bullae at admission *(black arrow)*. B: Twirling appearance of the right lung parenchyma *(arrowhead)* and lateral displacement of the same bullae observed 5 days later *(black arrow)*.

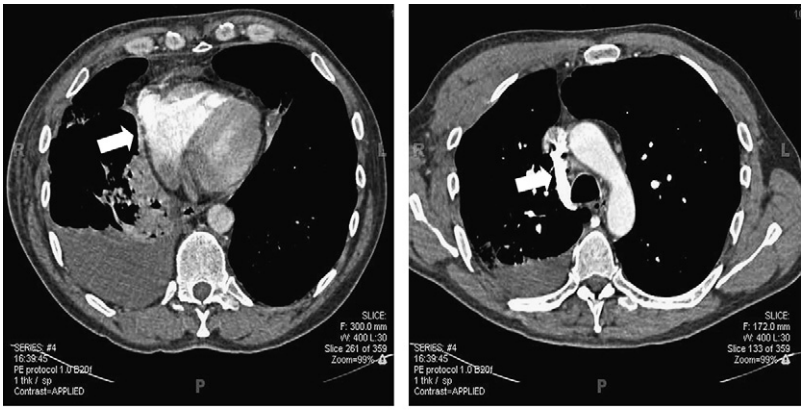

Figure 2. A, Flattened appearance of the right atrium on a CT scan obtained 5 days later *(white arrow)*. B, Retrograde filling of the azygos vein secondary to right atrial compression *(white arrow)*.

the most commonly encountered pulmonary lesion.[2] Pulmonary torsions have also been described after thoracic procedures that do not involve lung resections, such as cardiac operations, explorations for trauma, and esophagectomies.[3] Factors that contribute to this complication include complete fissures and transected inferior pulmonary ligaments. Pulmonary torsions that are not related to previous invasive thoracic interventions are rare. There are only a few case reports describing pulmonary torsions after blunt chest trauma. Complete torsion of the middle lobe leading to infarction has been reported in a patient who had been hit by a cow.[4] This complication was attributed to complete interlobar fissures. Another report described complete torsion of the entire lung in a patient who sustained blunt trauma to the chest in a motorcycle crash.[5] A traumatic tear of the inferior pulmonary ligament with loss of fixation was believed to have contributed to this complication. To our knowledge, our case is the first description of a posttraumatic partial lobar torsion secondary to a hemothorax.

Torsion may involve the entire lung or individual lobes and can be partial or complete. Complete torsion is defined as a twist exceeding 180°, can be associated with obstruction of vascular structures as well as airway, and can eventually lead to pulmonary infarction and gangrene. Over time, partial torsion may progress to complete torsion. Inasmuch as pulmonary torsion can be associated with a high rate of morbidity and mortality, a high index of suspicion and early surgical intervention are warranted. With complete torsion persisting for more than a few hours, it is usually not justified to preserve the involved lobe by just performing detorsion of the affected lobe. If, as in this case, torsion is partial and without vascular compromise, correction of the causative factors, such as evacuation of a hemothorax, may suffice to prevent further progression to complete torsion.

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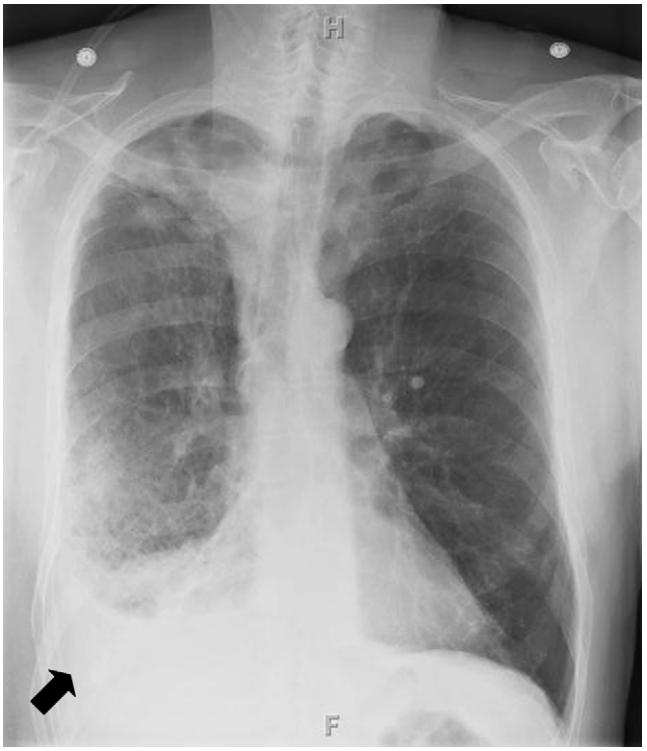
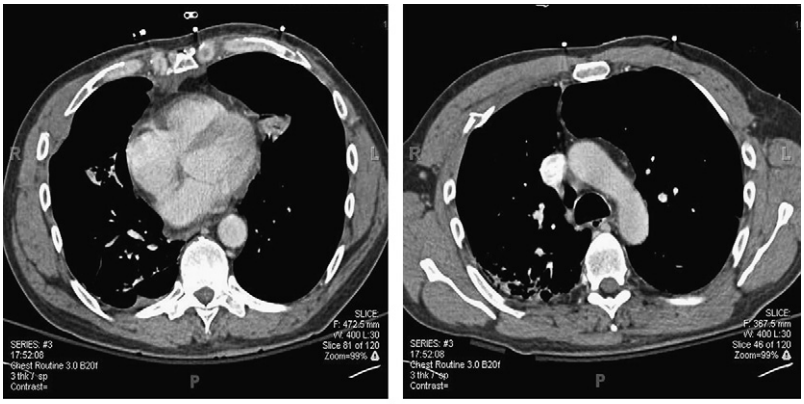


Figure E1. Chest x-ray film showing patchy right upper lung opacity and a new large right basilar effusion *(black arrow).*



A B

Figure E2. A, Regular shape of the right atrium on initial CT scan. B, Normal junction of the azygos vein to the superior vena cava at admission.